

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Mukesh Dalal
Serial No.: 09/528,457
Filing Date: March 17, 2000
Group Art Unit: 3627
Examiner: Steven B. McAllister
Title: SYSTEM AND METHOD FOR MULTI-PARTY
CONSTRAINED OPTIMIZATION

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Board of Appeals and Interferences
Assistant Commissioner of
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I hereby certify that the attached Appeal Brief (16 pages), Appendix A (9 pages) filed in triplicate, a company check in the amount of \$320.00 for the required filing fee (1 check), a Baker Botts return postcard (1 card), and this Certificate of Mailing are being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 C.F.R. 1.10 on this 20th day of December, 2002 addressed to the Assistant Commissioner for Patents, Washington, DC 20231.

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On Appeal From The Examiner To The Board
of Patent Appeals and Interferences**

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Appeal Brief

Appellant has appealed to the Board of Patent Appeals and Interferences from the decision of the Examiner mailed July 30, 2002, finally rejecting Claims 1-47. Appellant filed a Notice of Appeal on October 30, 2002. Appellant respectfully submits this Appeal Brief, in triplicate, with the statutory fee of \$320.00.

Real Party In Interest

This application is currently owned by i2 Technologies US, Inc., as indicated by:
an assignment recorded on March 17, 2000, in the Assignment Records of the United States Patent and Trademark Office at Reel 010698, Frame 0107; and
an assignment recorded on July 30, 2001, in the Assignment Records of the United States Patent and Trademark Office at Reel 012032, Frame 0151.

Related Appeals and Interferences

There are no known appeals or interferences which will directly affect or be directly affected by or have a bearing on the Board's decision regarding this appeal.

Status of Claims

Claims 1-47 are pending in this application. Claims 1-47 stand rejected pursuant to a final Office Action mailed July 30, 2002, and are all presented for appeal. All pending claims are shown in Appendix A.

Status of Amendments

All amendments submitted by Appellant were entered by the Examiner before the issuance of the final Office Action mailed July 30, 2002.¹

Summary of Invention

In particular embodiments of the present invention, a broker for multi-party constrained optimization may receive a first optimization problem and a first value from a first party to a negotiation, the first optimization problem including at least one first objective to which the first value relates. (Specification, Page 14, Line 14-17) The broker additionally may receive a second optimization problem and a second value from a second party to the negotiation, the second optimization problem including at least one second objective to which the second value relates. (Specification, Page 14, Lines 14-17) The broker may generate a global optimization problem according to the first and second optimization problems and the first and second values.

¹ Drawing corrections were submitted with the Response filed by Appellant on October 30, 2002. It is unclear whether the drawing corrections were entered, but in any case Appellant is prepared to resubmit them, if necessary, upon allowance of the claims.

(Specification, Page 14, Lines 24-26) The broker may generate a global solution to the global optimization problem, the global solution including a first value for the first objective which satisfies the first value and a second value for the second objective which satisfies the second value. (Specification, Page 14, Lines 26-27)

Statement of Issues

1. Are Claims 1-47 allowable under 35 U.S.C. § 112, first paragraph?
2. Are Claims 1-47 allowable under 35 U.S.C. § 112, second paragraph?
3. Are Claims 1-47 allowable over U.S. Patent No. 5,495,412 to Thiessen et al. ("*Thiessen*") under 35 U.S.C. § 103(a)?

Grouping of Claims

Pursuant to 37 C.F.R. § 1.192(c)(7), Appellant requests that the following claims be grouped together for purposes of this appeal:

1. Group 1: Claims 1-10, 15-26, 31-42, and 47.

Claims 1-10, 15-26, 31-42, and 47 may be deemed to stand or fall together for purposes of this appeal. Claims 2-10 and 15-16 depend from independent Claim 1; Claims 18-26 and 31-32 depend from independent Claim 17; and Claims 34-42 and 47 depend from independent Claim 33.

2. Group 2: Claims 11-12, 27-28, and 43-44.

Claims 11-12, 27-28, and 43-44 may be deemed to stand or fall together for purposes of this appeal. Claims 11 and 12 depend from independent Claim 1; Claims 27 and 28 depend from independent Claim 17; and Claims 43 and 44 depend from independent Claim 33.

3. Group 3: Claims 13-14, 29-30, and 45-46.

Claims 13-14, 29-30, and 45-46 may be deemed to stand or fall together for purposes of this appeal. Claims 13 and 14 depend from independent Claim 1; Claims 29 and 30 depend from independent Claim 17; and Claims 45 and 46 depend from independent Claim 33.

Appellant submits that the explanations provided in the Argument section do not merely point out differences between the claims but present arguments as to the separate patentability of each claim as required by 37 C.F.R. § 1.192(c)(7) and M.P.E.P. § 1206.

Argument

The rejection of Claims 1-47 under 35 U.S.C. § 112, first paragraph, is improper and should be withdrawn. The rejection of Claims 1-47 under 35 U.S.C. § 112, second paragraph, is also improper and should be withdrawn. In addition, the rejection of Claims 1-47 under 35 U.S.C. § 103(a) as being unpatentable over *Thiessen* is improper and should be withdrawn. Accordingly, Appellant respectfully requests the Board to reverse the final rejection of Claims 1-47 and to direct the Examiner to issue a Notice of Allowance with respect to Claims 1-47.

Claims 1-47 are allowable under 35 U.S.C. § 112, first paragraph

In the final Office Action mailed July 30, 2002, the Examiner rejected Claims 1-47 under 35 U.S.C. § 112, first paragraph, "as containing subject matter which was not described in the specification in such a way to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention."

First, according to the Examiner, although Claims 1, 17, and 33 recite "generating a global solution to a global optimization problem in accordance with the first optimal value, the second optimal value, the first value, and the second value," the specification "does not disclose how to generate a global solution according to these four values." The Examiner further stated that "One of ordinary skill in the art would not be able to practice the claimed invention without undue experimentation." Appellant respectfully submits that the Examiner's conclusions are clearly erroneous.

For example, the specification states:

A global solution may be defined as a union of mutually consistent solutions to the transmitted optimization problems of all parties 12 to the negotiation.

(Specification, Page 7, Lines 7-9)

For problem transmission, each party 12 transmits an optimization problem to the broker 14 that includes at least one objective 34 of COP 32. Together with or separate from their optimization problems, parties 12 each also communicates a threshold or other suitable value relating to each transmitted objective 34. Broker 14 may, instead or in addition to receiving a threshold value from a party 12, generate an optimal value according the optimization problem for party 12, to which solution values will be compared. . . . For solution generation, the broker 14 generates a linear program (LP) or other suitable formulation of the global optimization problem and then uses an associated LP solver or other solution generator to generate at least one global solution 54 to the global optimization problem. . . . In one embodiment, the global solution 54 transmitted to any party 12 should solve the optimization problem of that party 12 such that the resulting value of each of the transmitted objectives 34 is not less than the corresponding threshold or otherwise inconsistent with the transmitted value to which it relates.

(Specification, Page 9, Lines 10-30)

In the first round of discovery stage 52, parties 12a and 12b transmit to broker 14 their respective optimization problems, along with thresholds or other suitable values that correspond to objectives 34 included in the optimization problems. As described above, broker 14 may, instead or in addition to receiving a threshold from party 12, generate an optimal value according the optimization problem for the party 12, to which a solution value for party 12 are compared.

(Specification, Page 12, Lines 8-13)

In particular, Appellant respectfully notes that the specification describes that broker 14 may, in addition to receiving first and second values from parties 12, generate first and second optimal values, respectively, according to the first and second optimization problems, respectively. Thus, the specification clearly describes, "generating a global solution to a global optimization problem in accordance with the first optimal value, the second optimal value, the first value, and the second value," as recited in Claims 1, 17, and 33: (a) in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention; and (b) in such a way as to enable one of ordinary skill in the art to practice the claimed invention without undue experimentation.

Second, according to the Examiner, although Claims 1, 17, and 33 recite "determining a first optimal value according to the first optimization problem" and "determining a second

optimal value according to the second optimization problem," the specification "does not disclose how to arrive at the first and second optimum values." The Examiner further stated that "One of ordinary skill in the art would not be able to practice the invention as claimed without undue experimentation." Appellant respectfully submits that these conclusions are also erroneous.

As set forth above, the specification states:

For problem transmission, each party 12 transmits an optimization problem to the broker 14 that includes at least one objective 34 of COP 32. . . . Broker 14 may . . . generate an optimal value according the optimization problem for party 12, to which solution values will be compared.

(Specification, Page 9, Lines 10-16)

Appellant respectfully notes, and surely the Examiner would agree, that techniques for generating an optimal value based on an optimization problem are well known to those of ordinary skill in the art. Furthermore, even if multiple techniques could be used, the present invention is not limited to any particular technique. Moreover, the Examiner indicated elsewhere in the final Office Action that the Examiner had readily determined optimal values for X and Y based on a simple example provide in the specification, stating, "For instance, it is noted in Fig. 2, objective 34A is to maximize X and Y. However, the solution which maximizes X ($X = 36.7$, $Y = 26.7$) is not the solution which maximizes Y ($X = Y = 33.3$)." (Final Office Action, Page 4, Paragraph 2) Thus, the specification clearly describes "determining a first optimal value according to the first optimization problem" and "determining a second optimal value according to the second optimization problem," as recited in Claims 1, 17, and 33: (a) in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention; and (b) in such a way as to enable one of ordinary skill in the art to practice the claimed invention without undue experimentation.

The Examiner also rejected Claims 1-47 under 35 U.S.C. § 112, first paragraph, "as based on a disclosure which is not enabling" in that the fact that "the first and second optimization problems must be solvable for their respective optimum values is not shown in the specification." The Examiner stated, "That the first and second optimization problems are each determinate

systems so that they can be separately solved for their respective first and second optimum values is critical or essential to the practice of the invention, but not included in the claim(s) is not enabled by the disclosure." (Final Office Action, Page 3, Paragraph 3) The Examiner further stated, "That the first and second optimization problems must be solvable for their respective optimum values is not shown in the specification." (Final Office Action, Page 3, Paragraph 3) Appellant respectfully submits that these conclusions are clearly erroneous.

Appellant does not necessarily agree with the Examiner's characterization of the recited first and second optimization problems as being "determinate systems so that they can be separately solved for their respective first and second optimum values" or of the criticality or essentiality of such a characteristic.

In any event, as set forth above, the specification states:

For problem transmission, each party 12 transmits an optimization problem to the broker 14 that includes at least one objective 34 of COP 32. . . . Broker 14 may . . . generate an optimal value according the optimization problem for party 12, to which solution values will be compared.

(Specification, Page 9, Lines 10-16)

Appellant respectfully submits that, in describing generating an optimal value for a party according to an optimization problem for the party, the specification necessarily describes inherently the optimization problem being solvable to generate the optimum value. If the situation were otherwise, an example claim reciting "receiving a message" as disclosed in an example specification might be rejected as based on a disclosure which is not enabling in that the fact that the message must be capable of being received is not explicitly described in the specification. This clearly cannot be the case, either in this simple example or with respect to the present application.

Furthermore, with respect to allegedly critical features, M.P.E.P. § 2164.08(c) states:

Limiting an applicant to the preferred materials in the absence of limiting prior art would not serve the constitutional purpose of promoting the progress in the

useful arts. Therefore, an enablement rejection based on the grounds that a disclosed critical limitation is missing from a claim should be made only when the language of the specification makes it clear that the limitation is critical for the invention to function as intended. Broad language in the disclosure, including the abstract, omitting an allegedly critical feature, tends to rebut the argument of criticality.

Although the specification necessarily describes inherently the first and second optimization problems being solvable to generate the respective first and second optimum values, as discussed above, the specification does not include any language that "makes it clear that the limitation is critical for the invention to function as intended" as is required under the M.P.E.P. Moreover, the Abstract of the Disclosure in the present application includes broad language omitting the allegedly critical feature, which further rebuts the Examiner's argument of criticality.

For at least the above reasons, Appellant respectfully submits that Claims 1, 17, and 33 and all claims that depend from these claims are in full compliance with 35 U.S.C. § 112, first paragraph. Accordingly, Appellant respectfully requests the Board to reverse the final rejection of Claims 1-47 and to direct the Examiner to issue a Notice of Allowance with respect to Claims 1-47.

Claims 1-47 are allowable under 35 U.S.C. § 112, second paragraph

The Examiner rejected Claims 1-47 under 35 U.S.C. § 112, second paragraph, "as being indefinite for failing to particularly point out and distinctly claim" the subject matter which Appellant regards as the invention. However, the Examiner provided no further explanation. Appellant respectfully notes M.P.E.P. § 2171 ("If a rejection is based on 35 U.S.C. 112, second paragraph, the examiner should further explain whether the rejection is based on indefiniteness or on the failure to claim what applicants regard as their invention."); M.P.E.P. § 2172 ("A rejection based on the failure to satisfy this requirement is appropriate only where applicant has stated, somewhere other than in the application as filed, that the invention is something different from what is defined by the claims. In other words, the invention set forth in the claims must be presumed, in the absence of evidence to the contrary, to be that which applicants regard as their invention."); and M.P.E.P. § 2173.02 ("Examiners are encouraged to suggest claim language to applicants to improve the clarity or precision of the language used . . .").

The Examiner also rejected Claims 1-47 under 35 U.S.C. § 112, second paragraph, "as being incomplete for omitting essential elements or steps, such omission amounting to a gap between the elements or steps." According to the Examiner, "The omitted elements are: that the first and second optimization problems have constraint equations and objectives such that an optimal value can be determined for the objectives." Appellant respectfully submits that these conclusions are clearly erroneous.

Appellant does not necessarily agree with the Examiner's characterization of the recited first and second optimization problems as having "constraint equations and objectives such that an optimal value can be determined for the objectives" or of the criticality or essentiality of such a characteristic.

In any event, Appellant respectfully submits that in reciting generating an optimal value for a party according to an optimization problem for the party, Claims 1, 17, and 33 necessarily recite inherently the optimization problem being solvable to generate the optimum value. If the situation were otherwise, an example claim reciting "receiving a message" as disclosed in an example specification might be rejected as omitting essential elements or steps in that the fact that the message must be capable of being received is not explicitly recited in the claim. This clearly cannot be the case, either in this simple example or with respect to the present application.

Furthermore, Appellant respectfully notes that Claims 1, 17, and 33 explicitly recite a system, a method, and software, respectively, for multi-party "constrained" optimization and explicitly recite the first and second optimization problems comprising at least one first "objective" and at least one second "objective," respectively. In addition, Claims 2, 18, and 34 explicitly recite that the first optimization problem comprises at least a portion of a "constrained" optimization problem, and Claims 3, 19, and 35 explicitly recite the "constrained" optimization problem comprising at least one "constraint."

Moreover, as discussed above in connection with the Examiner's rejections under 35 U.S.C. § 112, first paragraph, M.P.E.P. § 2164.08(c) states with respect to allegedly critical

features:

Limiting an applicant to the preferred materials in the absence of limiting prior art would not serve the constitutional purpose of promoting the progress in the useful arts. Therefore, an enablement rejection based on the grounds that a disclosed critical limitation is missing from a claim should be made only when the language of the specification makes it clear that the limitation is critical for the invention to function as intended. Broad language in the disclosure, including the abstract, omitting an allegedly critical feature, tends to rebut the argument of criticality.

Although the specification describes, in one embodiment, the first and second optimization problems being constrained optimization problems comprising constraints, the specification does not include any language that "makes it clear that the limitation is critical for the invention to function as intended" as is required under the M.P.E.P. The Abstract of the Disclosure in the present application includes broad language omitting the allegedly critical feature, which also rebuts the Examiner's argument of criticality. In addition, as noted above, these features are explicitly recited in Claims 2-3, 18-19, and 34-35 rather than in Claims 1, 17, and 33, further rebutting the Examiner's argument through the principle of claim differentiation.

For at least the above reasons, Claims 1, 17, and 33 and all claims that depend from these claims are in full compliance with 35 U.S.C. § 112, second paragraph. Accordingly, Appellant respectfully requests the Board to reverse the final rejection of Claims 1-47 and to direct the Examiner to issue a Notice of Allowance with respect to Claims 1-47.

Claims 1-47 are allowable under 35 U.S.C. § 103(a)

In the final Office Action mailed July 30, 2002, the Examiner rejected Claims 1-47 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,495,412 to Thiessen et al. (*Thiessen*) Appellant respectfully submits that *Thiessen* fails to disclose, teach, or suggest the combination of limitations specifically recited in Appellant's claims.

Independent Claims

The Examiner admitted that "Thiessen does not show determining first and second optimal values according to the first and second optimization problems, respectively (it is noted

however, that the global solution would be 'in accord' with the first and second values as broadly claimed)." However, according to the Examiner, in hindsight, "it would have been an obvious matter of design choice to determine first and second optimal values and solve the problem according to them since the specification does not show that this step is for any particular reason or solves a particular problem and it appears that the method would work equally well in either configuration."

Appellant respectfully submits that the rejection is improper because the Examiner has not shown the required suggestion or motivation in *Thiessen* or in the knowledge generally available to one of ordinary skill in the art at the time of the invention to modify *Thiessen* in the manner the Examiner proposes. "The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination." M.P.E.P. § 2143.01 (emphasis in original) Nothing in *Thiessen* or in any other prior art of record suggests or motivates the proposed modification, nor has the Examiner provided specific evidence that suggests or motivates the proposed modification.² Appellant respectfully notes that speculation in hindsight that "it would have been an obvious matter of design choice" is insufficient under the M.P.E.P. and governing Federal Circuit case law.

In addition, contrary to the Examiner's assertions, the specification does provide one or more reasons to determine first and second optimal values according to the first and second optimization problems, respectively, as recited in Claims 1, 17, and 33.

For example, in one embodiment, the specification states:

Broker 14 may, instead or in addition to receiving a threshold value from a party 12, generate an optimal value according the optimization problem for party 12, to which solution values will be compared.

² Appellant respectfully requested that, if "common knowledge" or "well known" art was being relied on, the Examiner provide a reference in support of this position pursuant to M.P.E.P. § 2144.03. Appellant further requested that, if personal knowledge was being relied on to supply the required motivation or suggestion to modify, the Examiner provide an affidavit supporting such facts pursuant to M.P.E.P. § 2144.03.

(Specification, Page 9, Lines 14-16)

Using an equal distribution criterion, the values of objectives 34 for parties 12 must exceed their corresponding thresholds by the same amount. For example, if the thresholds for parties 12a and 12b are (10, 50), then both (20, 60) and (100, 140) are deemed fair, but (20, 100) is not. ... Using a minimum deviation from optimal criterion, instead of using thresholds, the optimal values of objectives 34 (which broker 14 may generate according to the transmitted optimization problems) are used while considering all the transmitted constraints 36 that relate to the objectives 34.

(Specification, Page 10, Lines 14-32)

That is, a global solution may be compared to the first and second optimal values to determine whether the global solution is fair. Accordingly, the specification provides a reason for determining first and second optimal values according to the first and second optimization problems, respectively, as recited in Claims 1, 17, and 33.

Furthermore, since *Thiessen* fails to disclose, teach, or suggest determining first and second optimal values according to the first and second optimization problems, respectively, as recited in Claims 1, 17, and 33, the procedure disclosed in *Thiessen* may yield solutions that are not in accordance with the objectives of the parties. Similarly, and contrary to the Examiner's assertion, the invention recited in Claims 1, 17, and 33 would not work equally well with or without determining first and second optimal values according to the first and second optimization problems, respectively.

If anything, *Thiessen* teaches away from the proposed modification. As discussed in Appellant's response to an Office Action mailed March 15, 2002, *Thiessen* merely discloses determining a satisfaction function for each party, combining the satisfaction functions to generate an optimization problem, and then solving the optimization problem. Given the limited disclosure of *Thiessen*, there would be no reason whatsoever to determine "a first optimal value according to the first optimization problem" and determine "a second optimal value according to the second optimization problem" in generating a global solution to a global optimization problem as recited in Claims 1, 17, and 33.

For at least the above reasons, Claims 1, 17, and 33 are patentable over Thiessen. Accordingly, Appellant respectfully requests the Board to reverse the final rejection of Claims 1, 17, and 33 and to direct the Examiner to issue a Notice of Allowance with respect to Claims 1, 17, and 33.

Dependent Claims

Appellant has demonstrated Claims 1, 17, and 33 to be allowable. Claims 2-16, 18-32, and 34-47 depend on Claims 1, 17, and 33, respectively, and are also allowable for at least this reason. In addition, these dependent claims recite numerous additional patentable distinctions over the prior art of record.

For example, *Thiessen* does not disclose, teach, or suggest receiving "filtering information from the first party and the second party" and using "the filtering information to determine one or more filtered solutions from among the global solutions according to a filtering approach," as recited by Claims 11, 27, and 43. The Examiner stated that *Thiessen* discloses "communicating possible alternative solutions to the parties, and receiving and applying filtering information comprising a weighted preferences approach from the parties," that *Thiessen* does not disclose "accomplishing these steps after computation of the global solution," and that "it would have been an obvious matter of design choice to modify the method of Thiessen by accomplishing the filtering steps after the global solution has been computed since applicant does not state that accomplishing the filtering in this manner at this time if for any particular reason . . . and it appears that the method would work equally well in either configuration." (Final Office Action, Page 6, Paragraph 8-Page 7, Paragraph 1)

First, Appellant again respectfully notes that a conclusory statement, necessarily involving speculation in hindsight, that "it would have been an obvious matter of design choice" is insufficient under the M.P.E.P. and governing Federal Circuit case law.

Second, contrary to the Examiner's assertions, the specification explicitly provides one or more reasons for receiving "filtering information from the first party and the second party" and

using "the filtering information to determine one or more filtered solutions from among the global solutions according to a filtering approach," as recited by Claims 11, 27, and 43. For example, as explicitly described in the specification, a solution filtering stage 56 may be performed "to discard any unacceptable discovered global solutions 54 and generate a set of one or more filtered solutions 58" and to allow a solution selection stage 60 "to select a single global solution 54 from among the filtered solutions 58 and generate a set of one or more selected solutions 62." (Specification, Page 8, Lines 23-26) It is axiomatic that filtering of global solutions must be performed after the global solutions have been generated. Furthermore, also as explicitly described in the specification, filtering stage 56 may allow parties 12 to, for example: (1) veto global solutions 54; (2) rank global solutions 54 such that global solution 54 lacking Pareto-optimal rankings are discarded; (3) provide values for global solutions 54 indicating the relative strength of their preferences for global solutions 54 such that global solutions 54 that optimize the total weight are determined and remaining global solutions 54 are discarded; and (4) combine two or more of the above. (Specification, Page 11, Lines 3-12) Aspects relating to these alternatives are recited in Claims 12, 28, and 44 which depend on Claims 11, 27, and 43, respectively.

Moreover, Appellant respectfully submits that there is no required motivation to modify *Thiessen* to include the recited features, if such were even possible, especially in light of the stringent standards for doing so under the M.P.E.P. and governing Federal Circuit case law. Accordingly, Appellant respectfully requests reconsideration and allowance of Claims 11-12, 27-28, and 43-44, and all claims that depend on these claims.

As another example, *Thiessen* does not disclose, teach, or suggest using "the selection information to determine a selected solution from among the solutions according to a selection approach," as recited in Claims 13, 29, and 45, or the selection approach being selected from the group consisting of "an auction approach" and "a random selection approach," as recited in Claims 14, 30, and 46. The Examiner admitted that *Thiessen* "does not disclose choosing the solution via an auction approach." (Final Office Action, Page 7, Paragraph 2) Appellant respectfully submits that there is there is no motivation to modify *Thiessen* to include these features, if such were even possible, especially in light of the stringent standards for doing so set

forth above. Appellant again respectfully notes that a conclusory statement, necessarily involving speculation in hindsight, that "It would have been obvious" is insufficient under the M.P.E.P. and governing Federal Circuit case law. Accordingly, Appellant respectfully requests reconsideration and allowance of Claims 13-14, 29-30, and 45-46.

Because Appellant believes the allowability of the independent claims and certain dependent claims has been amply demonstrated, and to avoid further burdening the record, Appellant has not provided detailed remarks concerning other dependent claims. However, Appellant remains ready to provide such remarks if it becomes appropriate to do so.

Accordingly, Appellant respectfully requests the Board to reverse the final rejection of Claims 1-47 and to direct the Examiner to issue a Notice of Allowance with respect to Claims 1-47.

Conclusion

Appellant has amply demonstrated that the present invention, as claimed, complies with all statutory requirements for a patent. Therefore, Appellant respectfully requests the Board to reverse the final rejection of the Examiner and to instruct the Examiner to issue a Notice of Allowance with respect to all claims.

Appellant has enclosed a check in the amount of \$320.00 for this Appeal Brief. Appellant believes no additional fees are due. However, the Commissioner is hereby authorized to charge any additional fees or credit any overpayments to Deposit Account No. 02-0384 of Baker Botts L.L.P.

Respectfully submitted,

BAKER BOTTS L.L.P.
Attorneys for Appellant



Christopher W. Kennerly
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Date: December 20, 2002

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Appendix A

1. A system for multi-party constrained optimization, the system operable to:
 - access a first optimization problem and a first value corresponding to a first party to a negotiation, the first optimization problem comprising at least one first objective to which the first value relates;
 - access a second optimization problem and a second value corresponding to a second party to the negotiation, the second optimization problem comprising at least one second objective to which the second value relates;
 - determine a first optimal value according to the first optimization problem;
 - determine a second optimal value according to the second optimization problem; and
 - generate a global solution to a global optimization problem in accordance with the first optimal value, the second optimal value, the first value, and the second value.
2. The system of Claim 1, wherein the first optimization problem is received from the first party and comprises at least a portion of a constrained optimization problem (COP) for the first party, the COP comprising at least the first objective.
3. The system of Claim 2, wherein the COP further comprises at least one constraint relating to one or more global variables.
4. The system of Claim 1, wherein at least the first value is selected from the group consisting of:
 - a threshold value received from the first party; and
 - the first optimal value determined according to the first optimization problem, the first optimization problem being received from the first party.
5. The system of Claim 1, wherein the global optimization problem comprises a linear programming (LP) problem.
6. The system of Claim 1, wherein the first optimal value for the first objective satisfies the first value, and the second optimal value for the second objective satisfies the second value.

7. The system of Claim 1, further operable to generate the global solution as a Pareto-optimal solution.

8. The system of Claim 1, further operable to generate the global solution as a fair solution according to one or more fairness criteria.

9. The system of Claim 8, wherein the fairness criteria are selected from the group consisting of:

- an equal distribution criterion;
- a geometric distribution criterion;
- a weighted distribution criterion;
- a weighted geometric distribution criterion; and
- a minimum deviation from optimal criterion.

10. The system of Claim 1, further operable to access an additional first value for the first party, access an additional second value for the second party, and generate an additional global solution satisfying the additional first value and the additional second value.

11. The system of Claim 1, further operable to:
communicate one or more global solutions to the first party and the second party;
receive filtering information from the first party and the second party;
use the filtering information to determine one or more filtered solutions from among the global solutions according to a filtering approach.

12. The system of Claim 11, wherein the filtering approach is selected from the group consisting of:

- a veto approach;
- a Pareto-optimal ranking approach;
- an optimal weighted preferences approach; and
- a mixed approach combining two or more of the above.

13. The system of Claim 1, further operable to:
communicate one or more solutions to the first party and the second party;
receive selection information from the first party and the second party; and
use the selection information to determine a selected solution from among the solutions
according to a selection approach.

14. The system of Claim 13, wherein the selection approach is selected from the
group consisting of:
an auction approach; and
a random selection approach.

15. The system of Claim 1, further operable to mediate at least a portion of a
negotiation between the first party and a third party substantially simultaneously with the
negotiation between the first party and the second party.

16. The system of Claim 1, wherein the system comprises a computer system.

17. A method for multi-party constrained optimization, comprising:
accessing a first optimization problem and a first value corresponding to a first party to a negotiation, the first optimization problem comprising at least one first objective to which the first value relates;
accessing a second optimization problem and a second value corresponding to a second party to the negotiation, the second optimization problem comprising at least one second objective to which the second value relates;
determining a first optimal value according to the first optimization problem;
determining a second optimal value according to the second optimization problem; and
generating a global solution to a global optimization problem according to the first optimal value, the second optimal value, the first value, and the second value, the global solution comprising an option for resolving the negotiation.

18. The method of Claim 17, further comprising receiving the first optimization problem from the first party, the first optimization problem comprising at least a portion of a constrained optimization problem (COP) for the first party, the COP comprising at least the first objective.

19. The method of Claim 18, wherein the COP further comprises at least one constraint relating to one or more global variables.

20. The method of Claim 17, wherein at least the first value is selected from the group consisting of:
a threshold value received from the first party; and
the first optimal value determined according to the first optimization problem, the first optimization problem being received from the first party.

21. The method of Claim 17, wherein the global optimization problem comprises a linear programming (LP) problem.

22. The method of Claim 17, wherein the first optimal value for the first objective satisfies the first value, and the second optimal value for the second objective satisfies the second value.

23. The method of Claim 17, wherein the global solution is generated as a Pareto-optimal solution.

24. The method of Claim 17, wherein the global solution is generated as a fair solution according to one or more fairness criteria.

25. The method of Claim 24, wherein the fairness criteria are selected from the group consisting of:

- an equal distribution criterion;
- a geometric distribution criterion;
- a weighted distribution criterion;
- a weighted geometric distribution criterion; and
- a minimum deviation from optimal criterion.

26. The method of Claim 17, further comprising:
accessing an additional first value for the first party;
accessing an additional second value for the second party; and
generating an additional global solution satisfying the additional first value and the additional second value.

27. The method of Claim 17, further comprising:
communicating one or more global solutions to the first party and the second party;
receiving filtering information from the first party and the second party;
using the filtering information to determine one or more filtered solutions from among the global solutions according to a filtering approach.

28. The method of Claim 27, wherein the filtering approach is selected from the group consisting of:

- a veto approach;
- a Pareto-optimal ranking approach;
- an optimal weighted preferences approach; and
- a mixed approach combining two or more of the above.

29. The method of Claim 17, further comprising:
communicating one or more solutions to the first party and the second party;
receiving selection information from the first party and the second party;
use the selection information to determine a selected solution from among the solutions according to a selection approach.

30. The method of Claim 29, wherein the selection approach is selected from the group consisting of:

- an auction approach; and
- a random selection approach.

31. The method of Claim 17, further comprising mediating at least a portion of a negotiation between the first party and a third party substantially simultaneously with the negotiation between the first party and the second party.

32. The method of Claim 17, wherein the method is implemented on one or more computer systems.

33. Software for multi-party constrained optimization, the software embodied in a computer-readable medium and operable to:

- access a first optimization problem and a first value corresponding to a first party to a negotiation, the first optimization problem comprising at least one first objective to which the first value relates;

- access a second optimization problem and a second value corresponding to a second party to the negotiation, the second optimization problem comprising at least one second objective to which the second value relates;

- determine a first optimal value according to the first optimization problem;

- determine a second optimal value according to the second optimization problem; and

- generate a global solution to a global optimization problem in accordance with the first optimal value, the second optimal value, the first value, and the second value, the global solution comprising an option for resolving the negotiation.

34. The software of Claim 33, wherein the first optimization problem is received from the first party and comprises at least a portion of a constrained optimization problem (COP) for the first party, the COP comprising at least the first objective.

35. The software of Claim 34, wherein the COP further comprises at least one constraint relating to one or more global variables.

36. The software of Claim 33, wherein at least the first value is selected from the group consisting of:

- a threshold value received from the first party; and

- the first optimal value determined according to the first optimization problem, the first optimization problem being received from the first party.

37. The software of Claim 33, wherein the global optimization problem comprises a linear programming (LP) problem.

38. The software of Claim 33, wherein the first optimal value for the first objective satisfies the first value, and the second optimal value for the second objective satisfies the second value.

39. The software of Claim 33, further operable to generate the global solution as a Pareto-optimal solution.

40. The software of Claim 33, further operable to generate the global solution as a fair solution according to one or more fairness criteria.

41. The software of Claim 40, wherein the fairness criteria are selected from the group consisting of:

- an equal distribution criterion;
- a geometric distribution criterion;
- a weighted distribution criterion;
- a weighted geometric distribution criterion; and
- a minimum deviation from optimal criterion.

42. The software of Claim 33, further operable to access an additional first value from the first party, access an additional second value from the second party, and generate an additional global solution satisfying the additional first value and the additional second value.

43. The software of Claim 33, further operable to:

- communicate one or more global solutions to the first party and the second party;
- receive filtering information from the first party and the second party;
- use the filtering information to determine one or more filtered solutions from among the global solutions according to a filtering approach.

44. The software of Claim 43, wherein the filtering approach is selected from the group consisting of:

- a veto approach;
- a Pareto-optimal ranking approach;
- an optimal weighted preferences approach; and
- a mixed approach combining two or more of the above.

45. The software of Claim 33, further operable to:
communicate one or more solutions to the first party and the second party;
receive selection information from the first party and the second party;
use the selection information to determine a selected solution from among the solutions according to a selection approach.

46. The software of Claim 45, wherein the selection approach is selected from the group consisting of:

- an auction approach; and
- a random selection approach.

47. The software of Claim 33, further operable to mediate at least a portion of a negotiation between the first party and a third party substantially simultaneously with the negotiation between the first party and the second party.